IWD#: L.	ANSCE-NS-06-01 #: 4		Activity/Task Title: Flight Path 4FP60R (GEANIE) Neutron Beam Experiments at LANSCE/WNR
TA: 53	Building: MPF-29	Room: 100	Additional Location Description: Inside the 4FP60R RSS boundary

#### Activity Description/Overview

Irradiation of samples/materials on WNR Target 4 neutron flight path 4FP60R (GEANIE) for experimental science goals, and operation of associated detector systems.

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
General training requirements for all flight path user experiments at WNR Flight Path 4FP60R				For non-LANL users:  - TA-53 User Facility Specific Training (39486)  - TA-53 Rad Worker Practical (24856)  - Rad Worker Exam (12909)  - TA53 Building Emergency Plan Program, MPF-29 (31744)  For LANL workers:  - TA-53 Employees/Residents Training Plan (201)  - TA53 Facility Specific Training (34095)  - Building Emergency Plan, MPF-29 (31744)  - TA53 Waste Awareness (22162)  - Radiological Worker II Training Requirements (Plan 115)  - Rad Worker II Classroom (20301)  - Rad Worker Practical (12910)
				- Rad Worker Exam (12909)

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Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
Flight Path Scientist or designated alternate must provide orientation to all flight path users at least annually. This orientation includes the following:  - Completion of LANSCE-NS User Checklist Pre-job briefing on this IWD Completion of user OJT on the EPACS for the flight path Signatures on the OJT Record of Completion.			- WNR User Checklist - Record of Completion of On-the-Job Training for User Orientation at WNR Flight Path - Experiment- specific LANSCE Safety Review Worksheet - AOM 6.05.73: 4FP60R Flight Path Area Sweep and Entry Procedures	- Flight Path 4FP60R Orientation and OJT (43038)
Flight Path Activity: Irradiate samples in neutron beam for experiments	Potential exposure to ionizing radiation when beam is on and shutter open.  - Potential exposure to	<ul> <li>TLD and PN-3 dosimeters required.</li> <li>The Experiment Personnel Access         Control System (EPACS) exclusion area         must be secured before the shutter can be         opened.</li> <li>Shielding around instrument and flight         path results in radiation levels outside of         EPACS boundary that are below posted         levels.</li> <li>Radiation Security System (RSS) system         ensures beam delivery ceases         immediately if EPACS boundary is         broken with shutter open.</li> <li>Anticipated radiation levels due to</li> </ul>		- See general training requirements

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	radiation from materials activated by the neutron beam.	activation are analyzed during the experiment safety review.  - All materials in the EPACS boundary must be monitored and tagged prior to release. Materials not surveyed by a RP-1 RCT should be labeled with a "Possibly Radioactive" sticker, and stored in a radiological controlled area.		ix.
Flight Path Activity: Changes to beam collimation and filtering.	<ol> <li>Beamline has a thin window that could be punctured or rupture, possibly resulting in damage to hearing.</li> <li>Potential exposure to radiation from activated beamline components.</li> <li>Potential abrasion, crush, pinch, or ergonomic injury from handling or dropping heavy collimator components.</li> </ol>	<ol> <li>a. Beamline vacuum must be vented prior to changes in collimation.</li> <li>b. Extra care should be taken when working in the vicinity of thin windows.</li> <li>Beamline components exposed to the neutron beam in the vicinity of the work must be surveyed prior to the start of activity, except for (a) steel collimators outside the shutter, and (b) Pb, poly and borated poly filters.</li> <li>Hard-toed shoes and work gloves required when handling large collimator components.</li> <li>Personnel are limited to lifting less than 50 lbs individually. Use good lifting technique by lifting with legs, not the back.</li> </ol>		- See general training requirements
Flight Path Activity: Monitor neutron flux using a fission ionization chamber.  Note: All activity involving troubleshooting, servicing, or maintaining fission ionization chambers is beyond the scope of this IWD. See LANSCE-NS-24,	Chamber has a thin window that could be punctured or rupture.     Window is under pressure up to 15 psig from P-10 gas.      If thin window is punctured, potential exposure to and inhalation/ingestion of	Quantity of radioactive material is less than 300 mg and fully contained within instrument under normal operating conditions.     Thin windows should be protected by covers when not in use or anytime work near the chamber is necessary. Take reasonable precaution to avoid puncturing windows when instrument is operating. Call an RCT if window is breached.		- See general training requirements

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"Operations of Fission Flux Monitors at LANSCE"	radioactive <sup>235</sup> U and/or <sup>238</sup> U material.  3. If thin window ruptures suddenly, potential hearing damage due to puncture of thin windows.	3. Thin windows should be protected by covers when not in use or anytime work near the chamber is necessary. Take reasonable precaution to avoid puncturing windows when instrument is operating		9
Cryogen Usage:  1. Hand filling of dewars, detectors, and experimental equipment with liquid nitrogen.	<ol> <li>Potential for asphyxiation due to release of excessive nitrogen into the room.</li> <li>Potential for cryogenic burns.</li> <li>Potential for enhanced flammability or explosion due to oxygen condensing on liquid nitrogen temperature surfaces.</li> </ol>	<ol> <li>Oxygen sensors monitor oxygen levels and low oxygen alarms sound if levels fall below safe levels in MPF-29.</li> <li>Safety glasses, face shield, and insulated gloves are required when handling components that might contain liquid nitrogen, when handling open dewars of liquid nitrogen, or when filling dewars or detectors with liquid nitrogen. Pants with no cuffs should be worn when working with cryogens. No open toed shoes may be worn when working with cryogens.</li> <li>Combustible materials should be avoided in the vicinity of components that may be at cryogenic temperatures.</li> </ol>		- Cryogenic Fluids Worker (Plan 2720) - Cryogen Safety (8876) - Chemical Hazard Comm. (25418)
Cryogen Usage:  2. Operation, maintenance and modification of the automated liquid nitrogen fill system on the GEANIE experiment in 4FP60R.  Note: All activity involving the automated liquid nitrogen fill system beyond passive operation must utilize the reference documents to proceed.	Same as for Cryogen     Usage 1 (see above)	1. Same as for Cryogen Usage 1 (see above)  Only personnel who have completed the LANSCE-NS qualification plan for this activity are authorized to work on this system.	- LANSCE-NS-QP-1, "Operation, Maintenance, and Modification of LANSCE- NS Manual and Automated Liquid Nitrogen Filling System"	- Flight Path 4FP60R Orientation and OJT (43038)

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×			- IWD: LANSCE-NS- 25, "Trouble- shooting and Maintenance of the Automatic LN2 System in MPF29"	
Lead or Cadmium Use:  1. Use of lead and cadmium shielding with no modification	Potential risk of ingesting lead and cadmium through casual contact.	1.Area is posted as a "Lead & Cadmium Use Area." No food or drink is permitted in area.		See general training requirements
Lead or Cadmium Use:  2. Rearranging experiment- specific, hand-stacked lead shielding or cadmium components  (Limited to minor hand stacked experiment shielding changes)	<ol> <li>Potential risk of ingesting lead and cadmium through contact or inhalation of dust.</li> <li>Potential crush hazard if lead bricks are dropped.</li> <li>Potential for ergonomic injury from improper lifting technique or lifting excessive weight.</li> </ol>	<ol> <li>Area is posted as a "Lead &amp; Cadmium Use Area." No food or drink is permitted in area. Gloves must be worn when handling lead and/or cadmium.</li> <li>Hard-toed shoes required when moving lead bricks or other heavy components.</li> <li>Polymer gloves (nitrile, etc.) required to prevent exposure through handling.</li> <li>Leather, or similar, work gloves required when handling heavy bricks or other components that may damage polymer gloves under normal conditions. Work gloves must be labeled "For Lead and Cadmium Use Only" and stored in a sealed plastic container or bag when not in use.</li> <li>Personnel are limited to lifting less than 50 lbs individually. Use good lifting technique by lifting with legs, not the back.</li> </ol>		For Lead Handling:  - Lead Exposure Below the Action Level (Plan 3675)  - Lead Awareness (4426)  - Chemical Hazard Communication Introduction (25418)  For Cadmium Handling:  - Cadmium Training (Plan 8814)  - Cadmium Awareness Self-Study (40693)

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Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
Waste generation and control	Potential for unnecessary waste generation     Potential for low hazard waste being mixed with higher hazard waste resulting in unnecessary quantities of higher level waste generation	Waste will be segregated as "clean", low-level radioactive, hazardous, or mixed hazardous waste as appropriate.     If production of hazardous or mixed waste is identified in the safety review, additional training and work control will be required in the experiment specific IWD.     Coordinate generation and disposal of hazardous and mixed waste generation with Waste Coordinator.	P 409 Waste Management	See general training requirements
Experiment specific tasks	To be identified through the Experiment Safety and Technical Review Process	As specified in experiment specific IWD, if any		As required by experiment specific IWD

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THE REAL PROPERTY OF THE PARTY	HAZARD GRADING AND PIC ASSIGNMENTS
Hazard Grading  ☐ Low-hazard	Primary PIC Matt Devlin
Moderate-hazard	Alternate PIC Ron Nelson
☐ High-hazard/complex	Alternate PIC Nic Fotiadis
Standing	Alternate PIC

· 直接的 发展。	HAZARD ANALYSIS, SUB	JECT MATTE	R EXPERT AN	ND PEER REVIEW		
Date Hazard Analysis	Completed:	Attach list of additional participants, if necessary				
Subject Matter				Date Signature		
Health Physics	Mike Duran	106440	5/26/10	- mho Dura		
Industrial Hygiene	Mark Mullis	238137	5/21/2010	week frulli		
Laser Safety	N/A					
Electrical Safety	N/A					
Waste Management	Lance Kloefkorn	117583	5-20-10	Mackon		
Classification	N/A			0. /		
Peer	Howard Nekimken	100052	6/1/10	Horaco Rehinler		

RESPONSIBLE LINE MANAGER REVIEW AND AUTHORIZATION							
The RLM and FOD or Representative approve work based upon confidence that this IWD has been properly prepared, that	FOD (Signature/Z#/Date) (11476 7 June 2010						
the work will be performed within ES&H/S&S requirements, facility requirements and capabilities, and will be performed in	RLM (Signature/Z#/Date) Usned 6. Nels 102/0/ 6/3/10						
accordance with this IWD.	Date approval valid through: $6/2/11$						

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FOD must dete	ermine the fac	ility entry	and coordination	requiremen	ts and identif	y the ES&H/S&	S hazards and	controls as	sociated with the activity location.	W.
FOD Des	ignated	Name		Phone			Pager		Email	
Facility P Cont	act	Leo Bit			667-0333		664-7996		lbj@lanl.gov	
☐ No entry/c☐ POTD/PC☐ Work mus	Entry and Coordination Requirements (Check one or more of the following)  No entry/coordination requirements									
	zards and co	ontrols, p ng requi	ootential conflicts red.	s with co-lo	ocated activi	ties, or any fa	acility restriction	ns on the	vity. (Things to consider include spactivity.) Identify relevant reference	
		HAR.	ACILITY/WO	RK-ARE	A INFORI	MATION R	ELEVANT T	O THIS	ACTIVITY	
						(4)				
Reference D		*>								
Training Red	quirements									
	been applied	approp	pon confidence t riately, and appr	hat the IW	M X	ONS DIRE	Date)	ROVAL 11147	6 7 Luczo10	

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#### **Pre-Job Brief Content**

- · What are the critical steps or phases of this activity?
- · How can we make a mistake at that point?
- · What is the worst thing that can go wrong?
- What controls, preventive measures, and bounding conditions are needed?
- What work permits are required and how will we meet their requirements?
- What are the handoffs and coordination requirements among workers and multiple PICs?

- · Are there hold-points including those that require sign-offs?
- What are the stop work responsibilities and expectations (e.g. for unanticipated conditions or hazards)?
- · How would we respond to alarms and emergencies?
- · Are there lessons learned from previous similar work?
- Is other information needed to perform this activity in a safe, secure, and environmentally responsible manner?
- Does everyone agree to the work tasks/steps, hazards, and controls and commit to follow them?

FOD WORK RE	ELEASE		
By signing, I verify this activity is compatible with current facility configuration and operating conditions  If required by FOD in Part 2.	FOD Designee (Signature/Z#/Date)  Date approval expires:		
PERSON IN CHARGE V	VORK RELEASE		
<ul> <li>By signing, I have verified the following:</li> <li>I have verified authorization by ensuring approval signatures of the RLM and FOD.</li> <li>I have jointly conducted a walkdown with workers to confirm the IWD can be performed as written, required initial conditions and other prerequisites are in-place.</li> <li>The assigned workers are authorized and are qualified to perform the work in a safe, secure, and environmentally responsible manner.</li> <li>I have conducted the pre-job briefing, and all workers have been briefed.</li> <li>I have ensured coordination with any required FOD work-area representatives (e.g., area work coordinators).</li> </ul>	PIC (Signature/Z#/Date)		
Alternate PIC Signatures <b>Required</b> when PIC authority is assumed the first time (Note: alternate PICs are required to sign only once, but formal handoff and employee notification are required for each PIC change).	Alt. PIC  Alt. PIC		

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# PRE-JOB BRIEF ATTENDANCE ROSTER

By signing below, I agree to the following:

- I agree to follow the work steps and implement the controls as written.
- I agree to stop work when conditions or hazards change or when I encounter unexpected conditions during the execution of work, or when work cannot be performed as written, or instructions become unclear during execution.
- I confirm that I am authorized, qualified, and fit to perform the work.

Worker Name (print)	Z#	Date	Signature